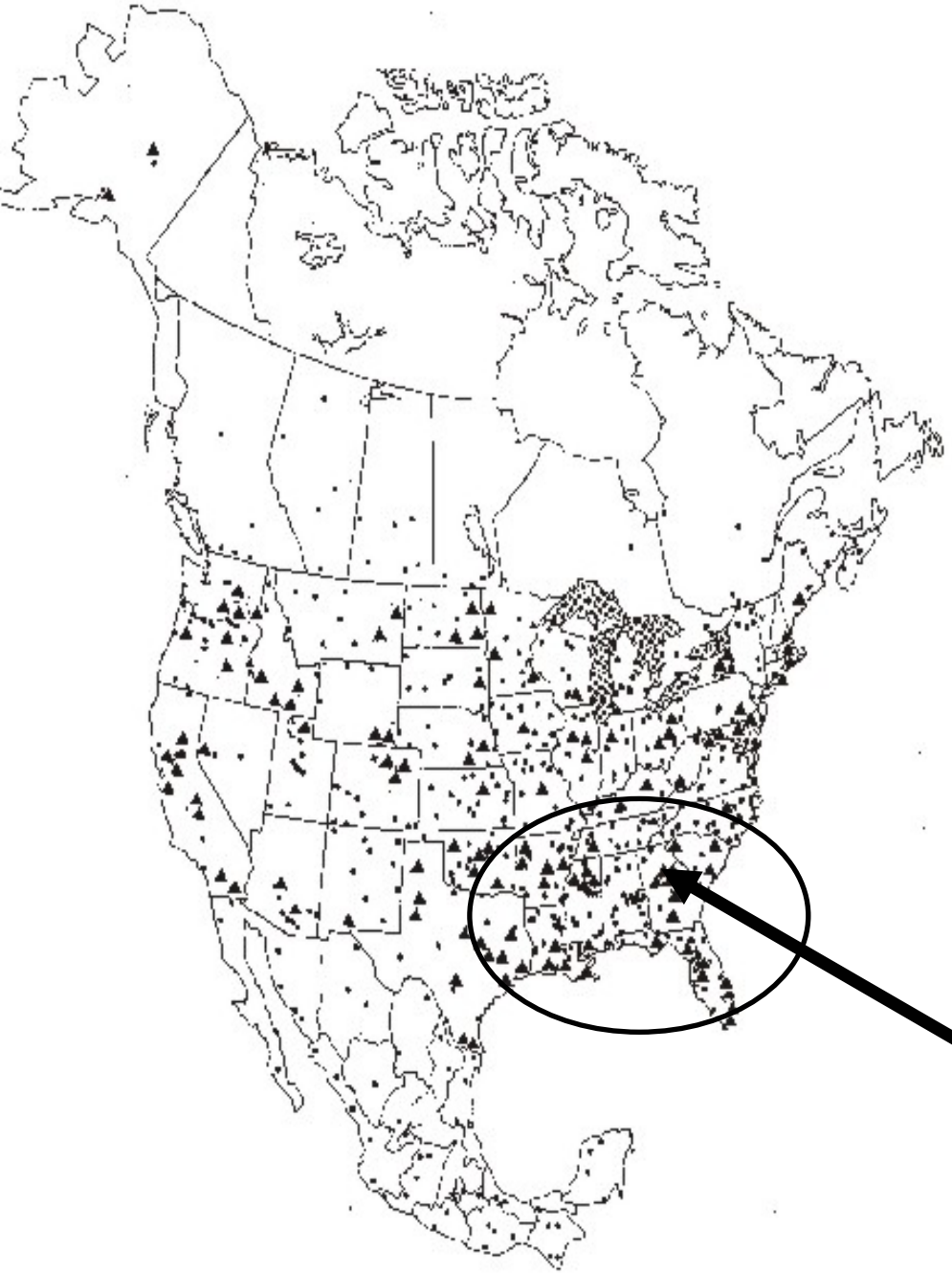

SOIL

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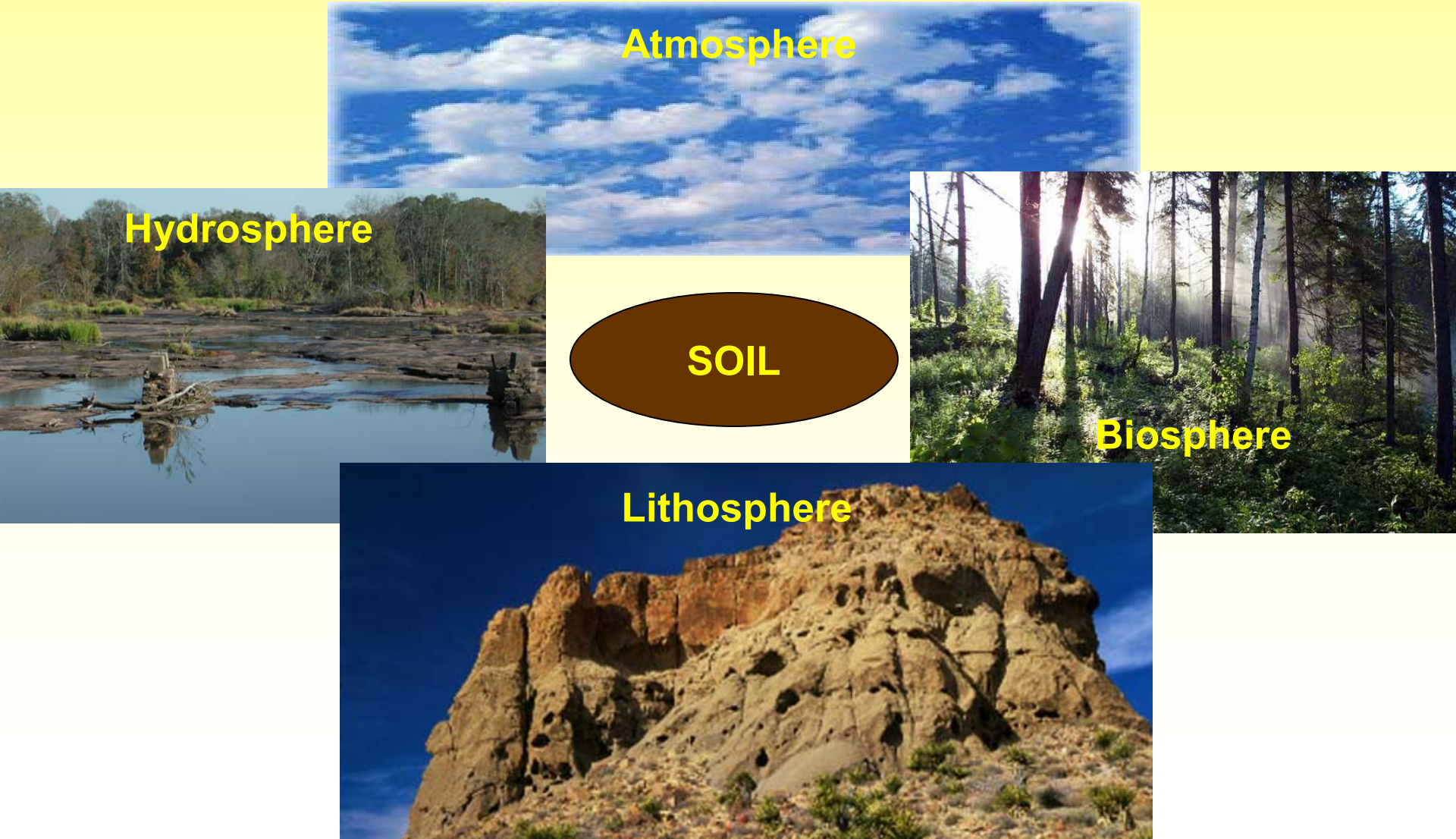
What is Soil?

- The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants
- …that has been subjected to and shows the effects from genetic and environmental factors
  - climate (including water and temperature effects)
  - macro- and microorganisms
  - conditioned by relief
  - acting on parent material over a period of time

Why is Soil Important?

- Soil is vital to all life on earth because it supports the growth of plants, which supply food and oxygen and absorb carbon dioxide and nitrogen.

Soil in the Environment



Functions of Soil

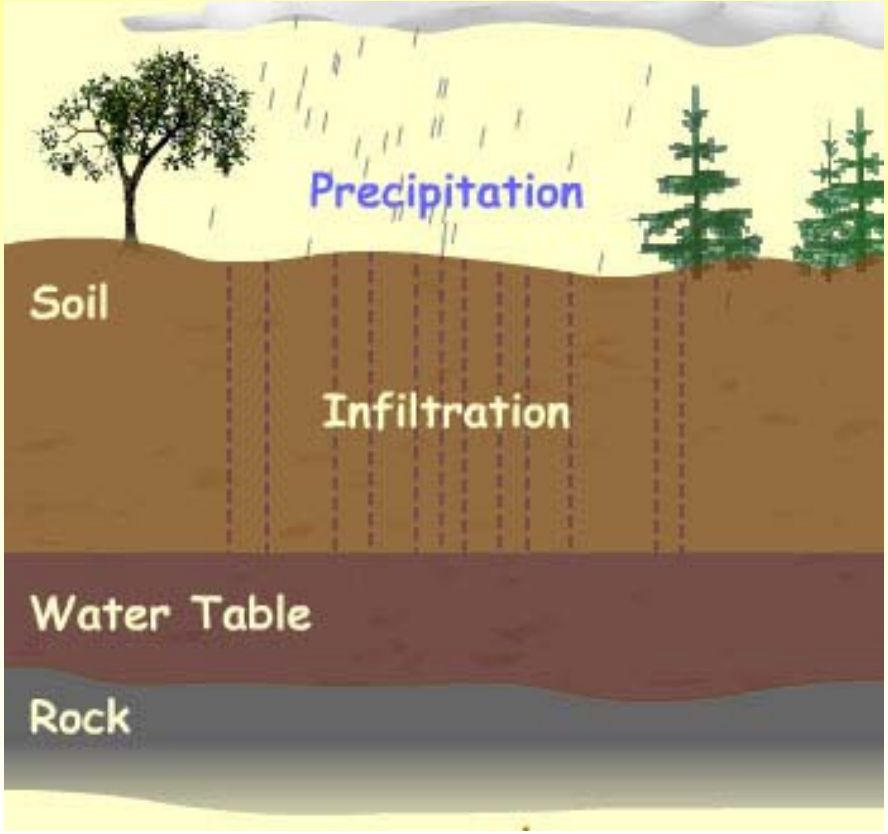
http://soilcrop.tamu.edu/research/sorghum/cornears.jpg

Medium for plant growth

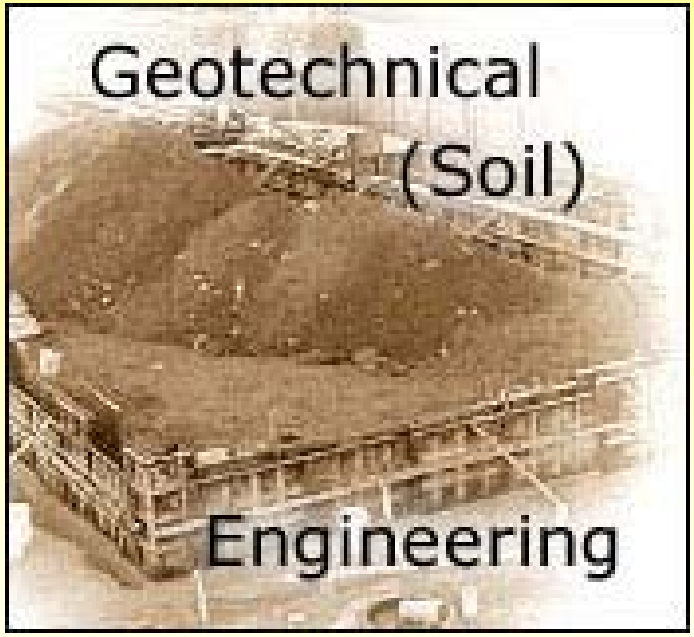
http://www.organicagcentre.ca/assets/earthworm.jpg

Habitat for organisms

Functions of Soil



http://techalive.mtu.edu/meec/module06/images/Infiltration.jpg



http://www.grow.arizona.edu/SPTUI--CWIS/Themes/Theme--Grow/feature2.jpg

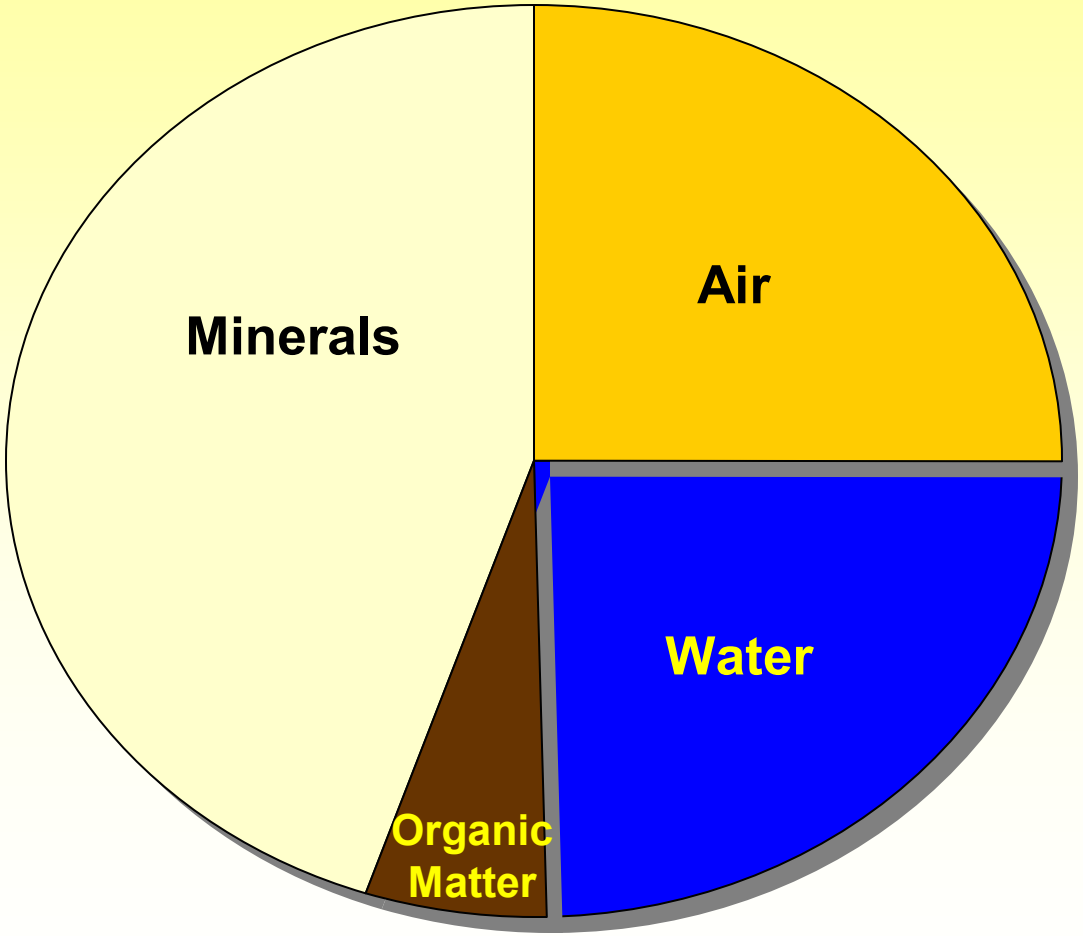
Engineering medium

System for water supply and purification

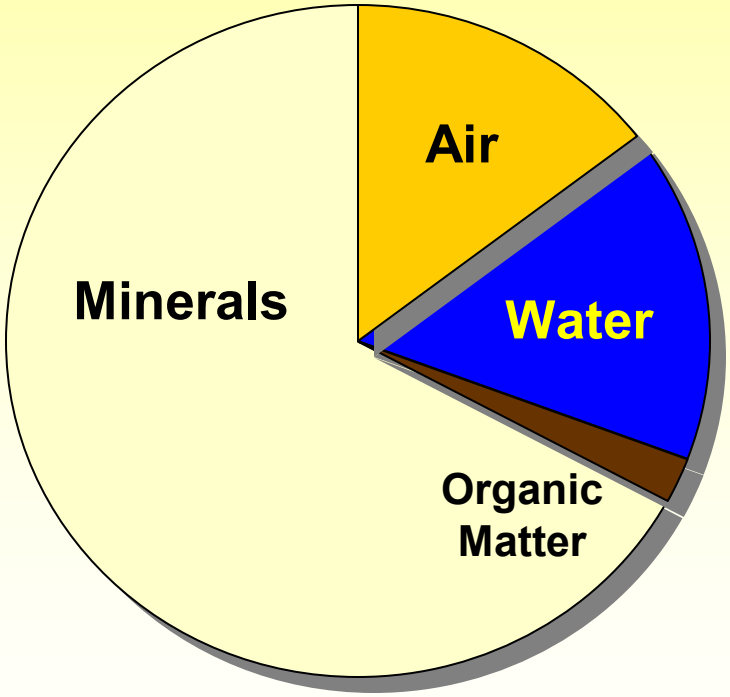
Functions of Soil

Recycling system for nutrients and organic waste

What is Soil Made of?

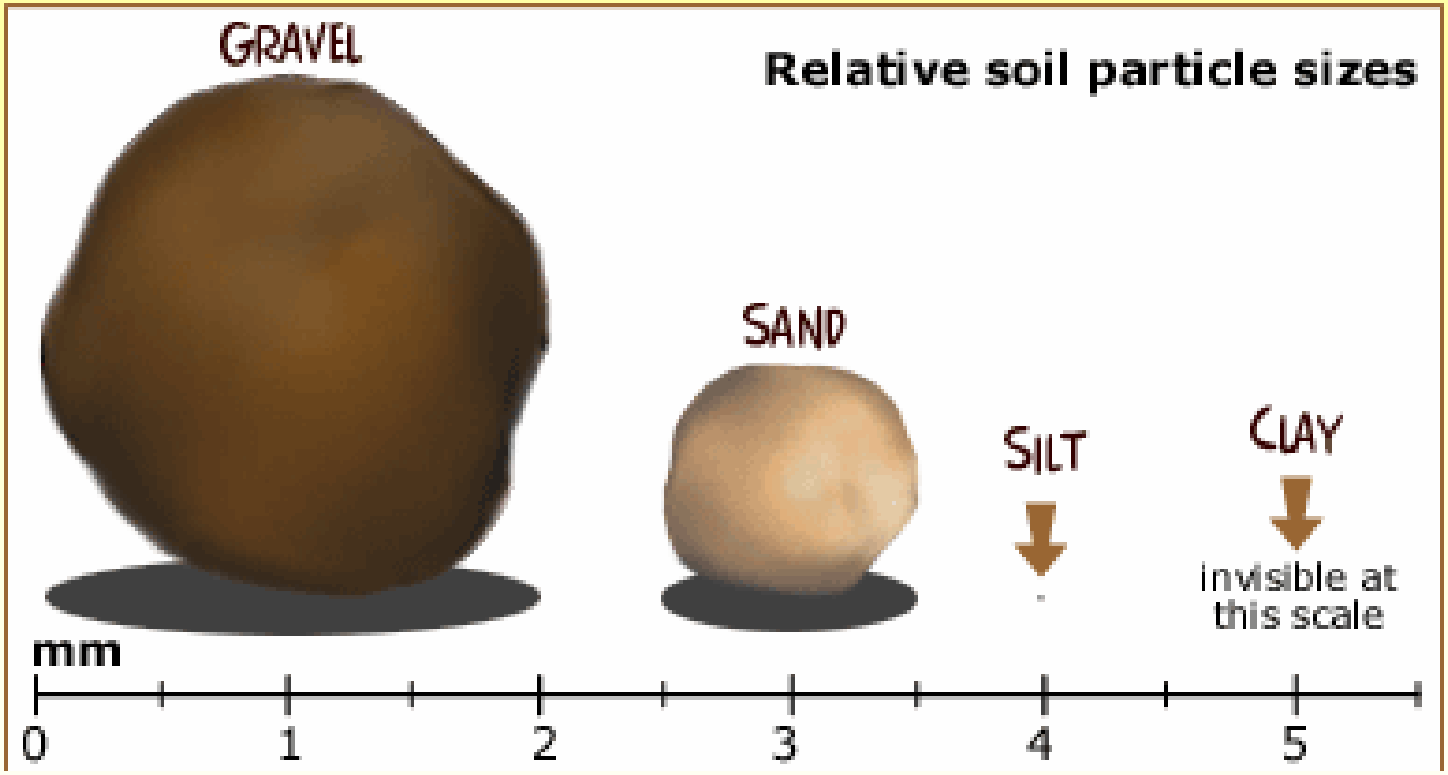


Ideal proportions



Poor condition

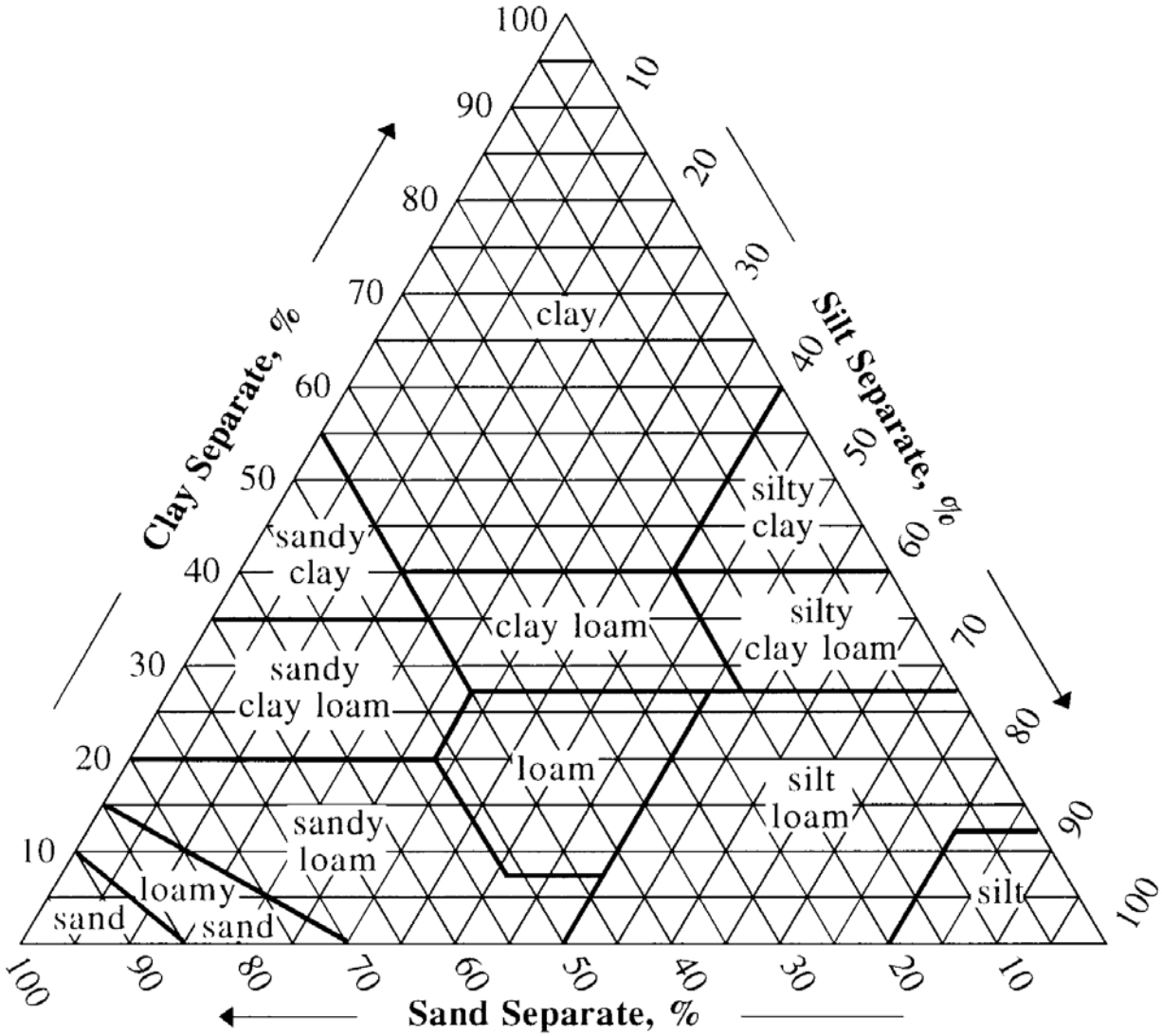
Soil Particle Size



USDA	GRAVEL	SAND					SILT	CLAY
		Very Coarse	Coarse	Medium	Fine	Very Fine		

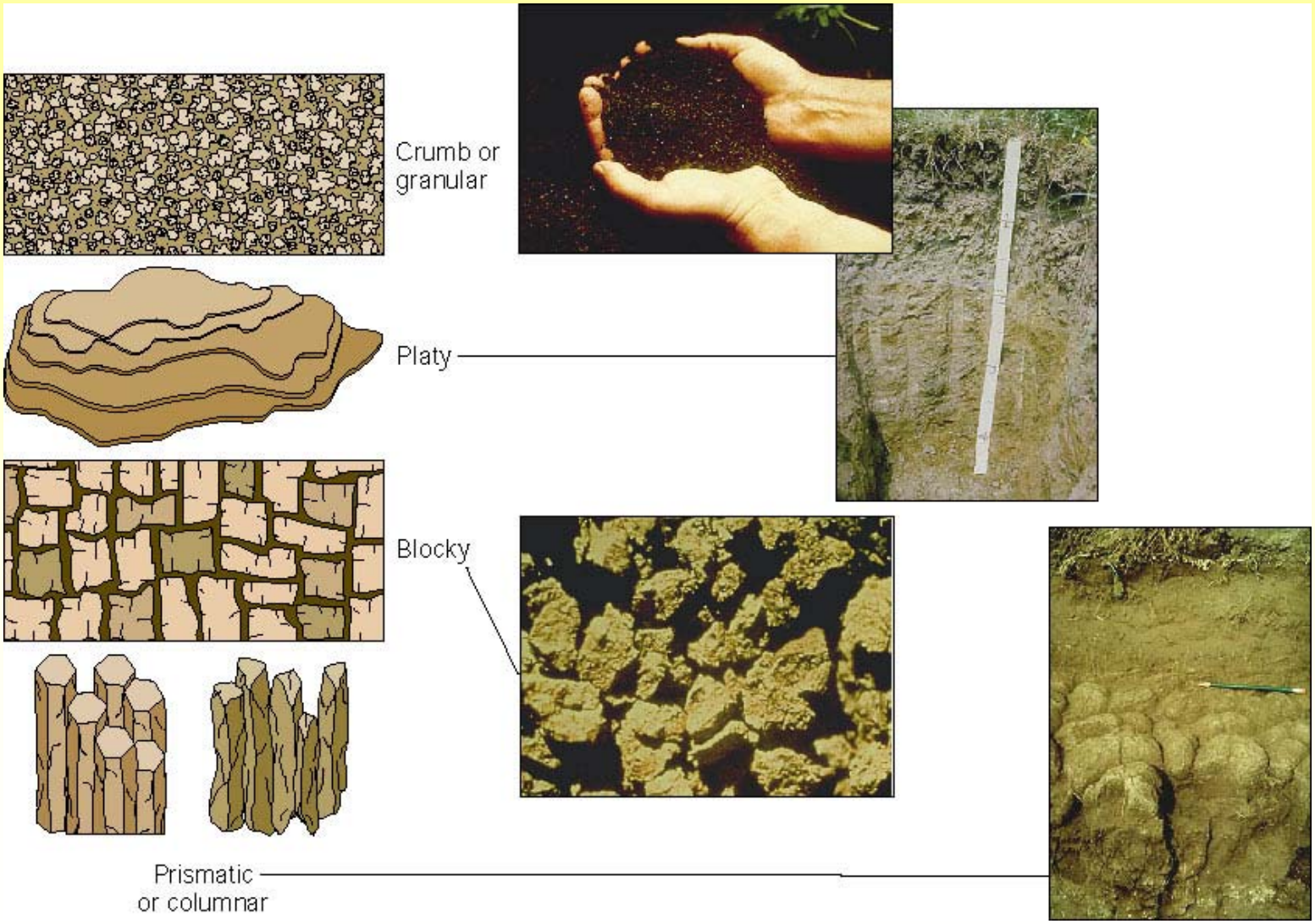
70 mm **2 mm** **0.05 mm** **0.002 mm**

Soil Texture



http://soils.usda.gov/technical/handbook/images/Part618Exhibit8_hi.jpg

Soil Structure



http://piru.alexandria.ucsb.edu/collections/geosystems/geosystems18-05.jpg

Soil Color

http://piru.alexandria.ucsb.edu/collections/geosystems/geosystems18-03.jpg

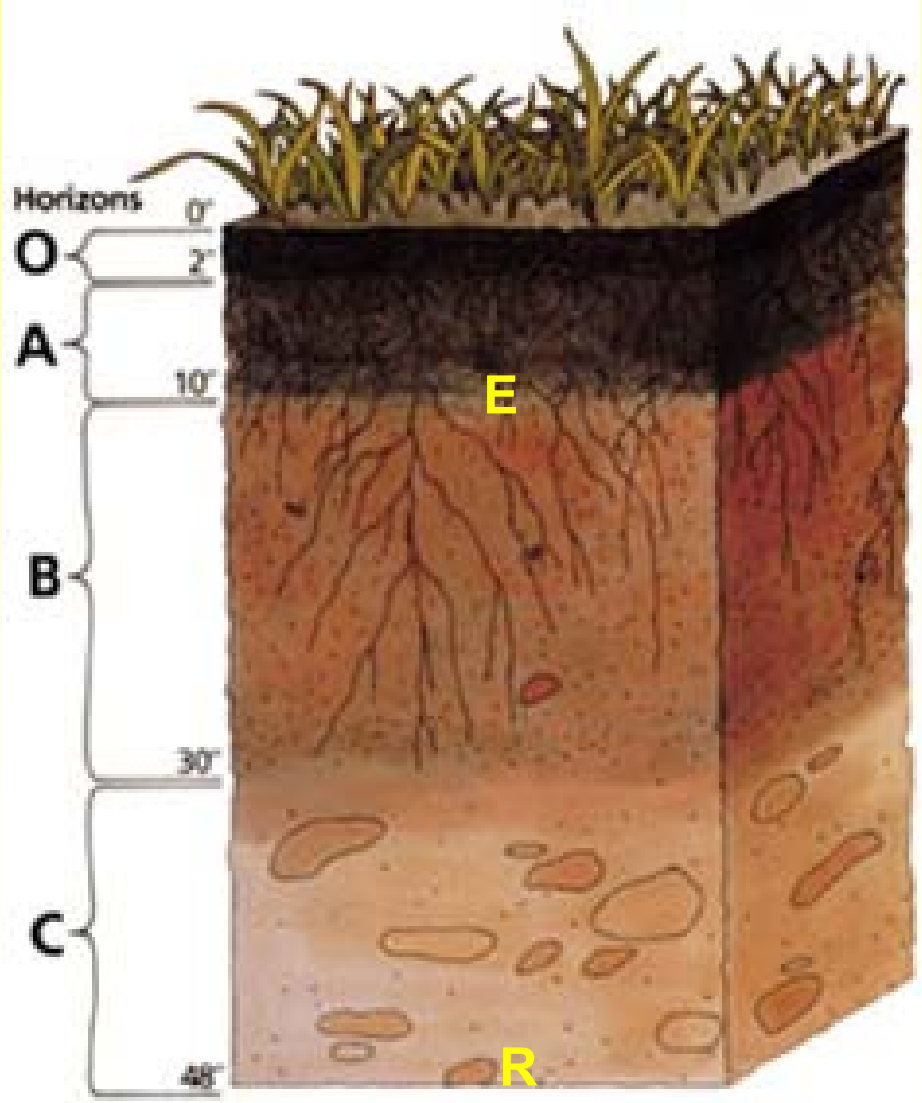
Soil Profile

Organic
(semi-decomposed surface residue)

A – Topsoil
(mineral, dark, coarse)

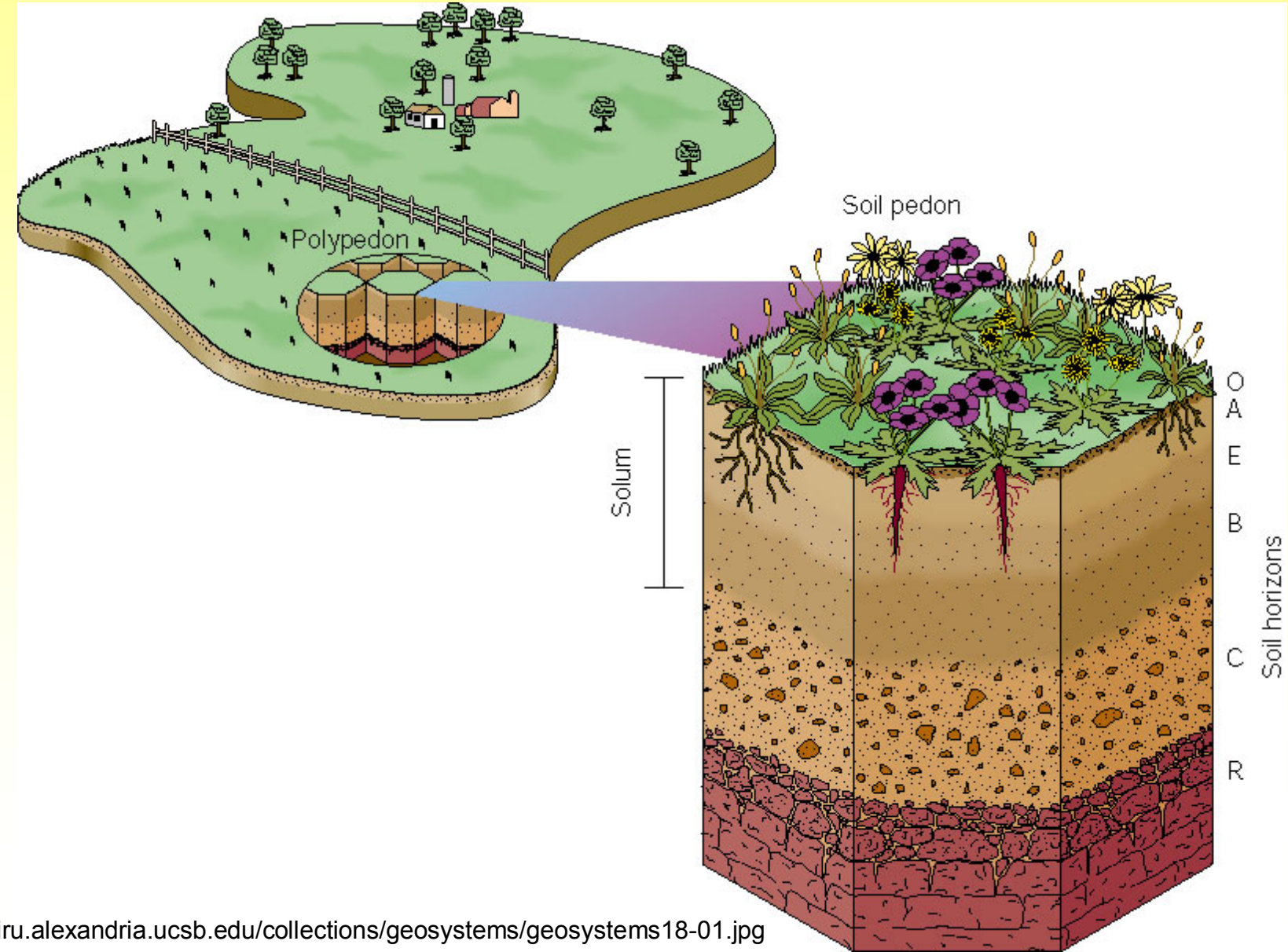
B – Subsoil
(mineral, weathered, deposits)

C – Unconsolidated
(below solum, intermediate w/ bedrock)



What are two other horizons that might be found in a profile?

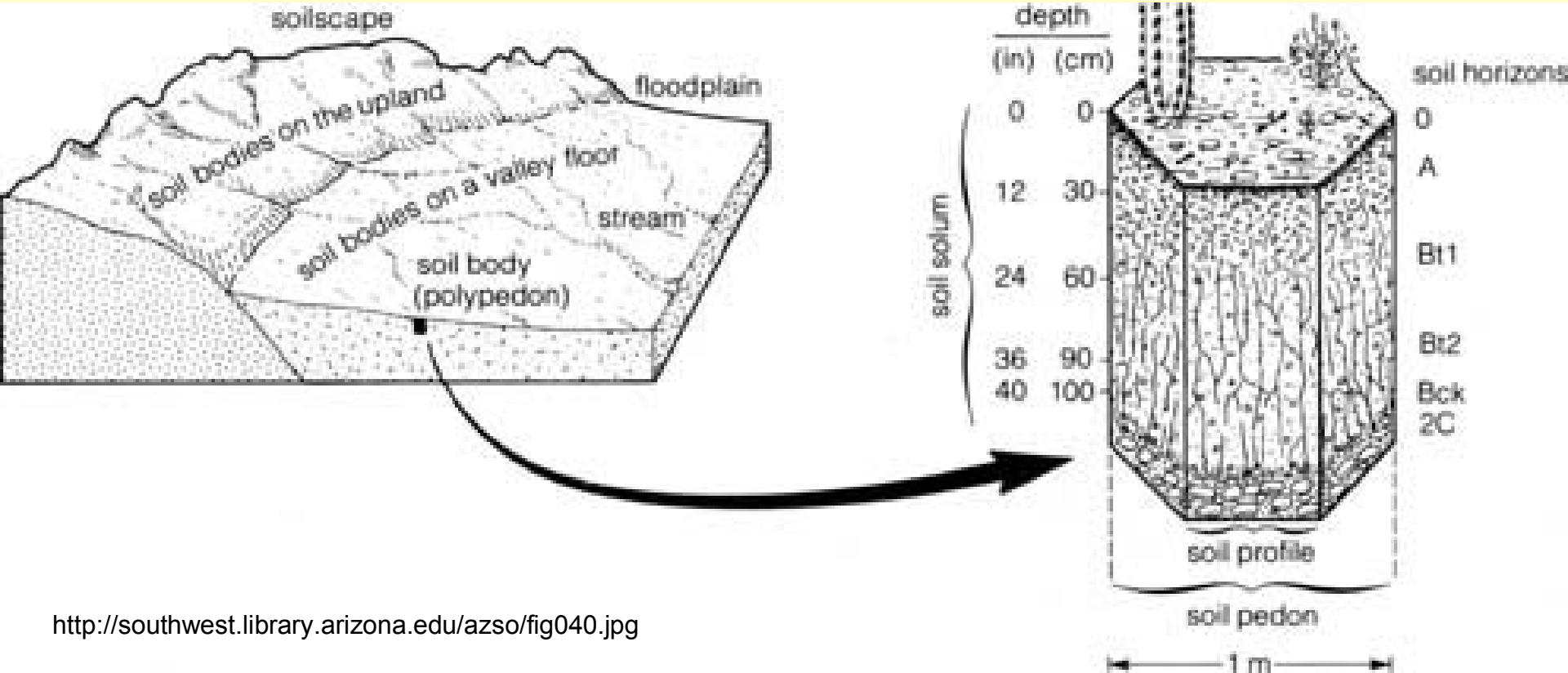
Soil Classification



http://piru.alexandria.ucsb.edu/collections/geosystems/geosystems18-01.jpg

Soil Classification

Groups of pedons (polypedons) occur within a landscape position



http://southwest.library.arizona.edu/azso/fig040.jpg

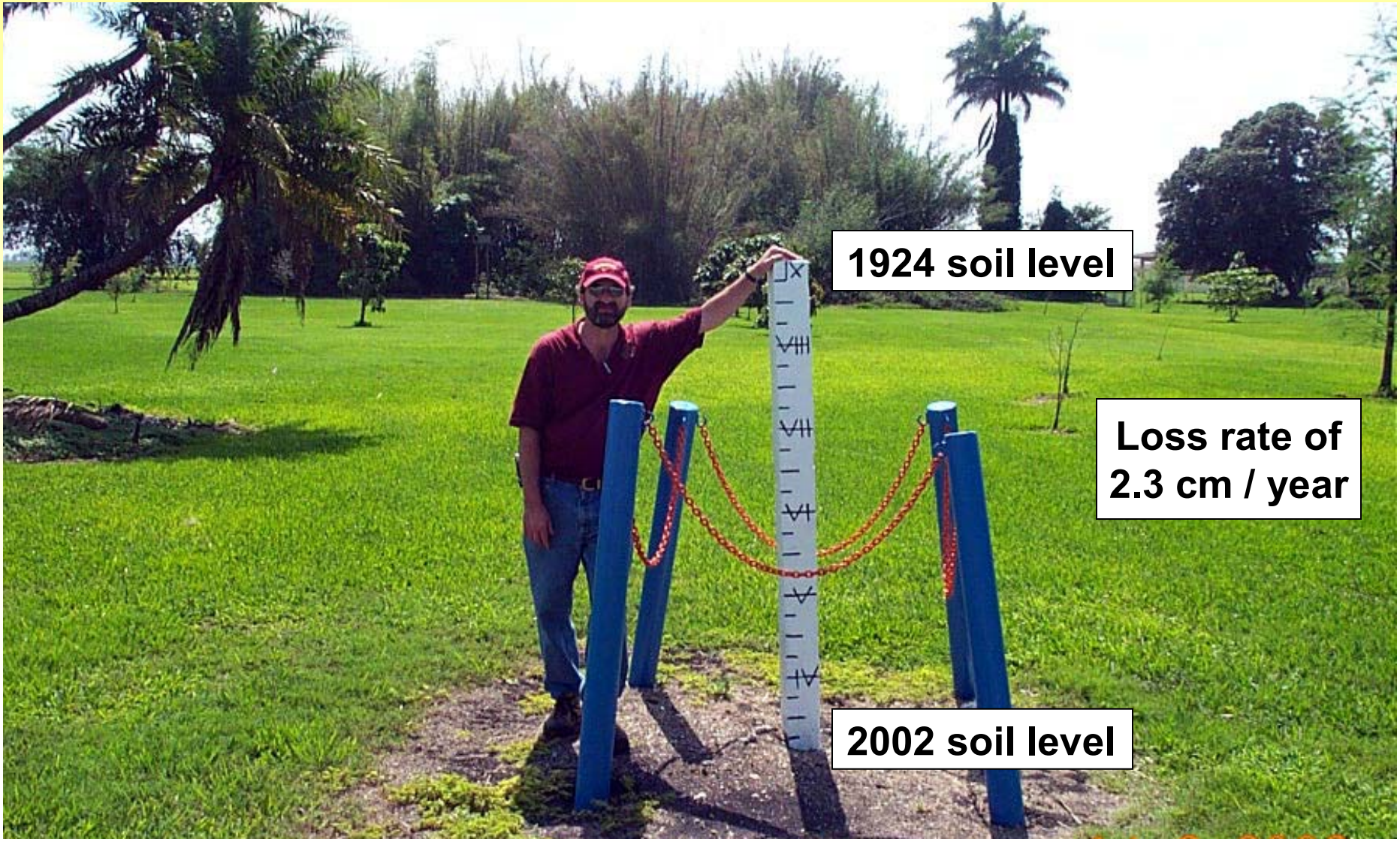
5 Factors of Soil Formation

1. Parent material
   - Geological or organic precursors to the soil
2. Climate
   - Precipitation and temperature
3. Biota
   - Native vegetation, microbes, soil animals, humans
4. Topography
   - Slope, aspect, landscape position
5. Time
   - Elapsed time from exposure of parent material

Threats to Soil

- Natural
- Human-induced

Subsidence



Compaction

http://www.noble.org/Ag/Soils/SoilCompaction/SoilCompactionWetField.jpg

http://ianrpubs.unl.edu/soil/graphics/soil1a.jpg

Salinization

Conservation practice: Planting of salt-tolerant vegetation for wildlife habitat

http://www2.gtz.de/desert/images/fotos/hg_versalzung2.jpg

Pollution

www.okinternational.org/ projects.html

http://www.emse.fr/en/transfert/spin/images/Figure8.jpg

Wind Erosion

USDA-NRCS

www.oznet.ksu.edu/fieldday/ kids/wind/erosion.htm

www.cosmicharmony.com/ Ia/NaturWnd/Sahara.jp

USDA-NRCS

Water Erosion

http://piru.alexandria.ucsb.edu/collections/geosystems

USDA-NRCS

www.alaskaswcds.org/ Palmer/buftypes.html

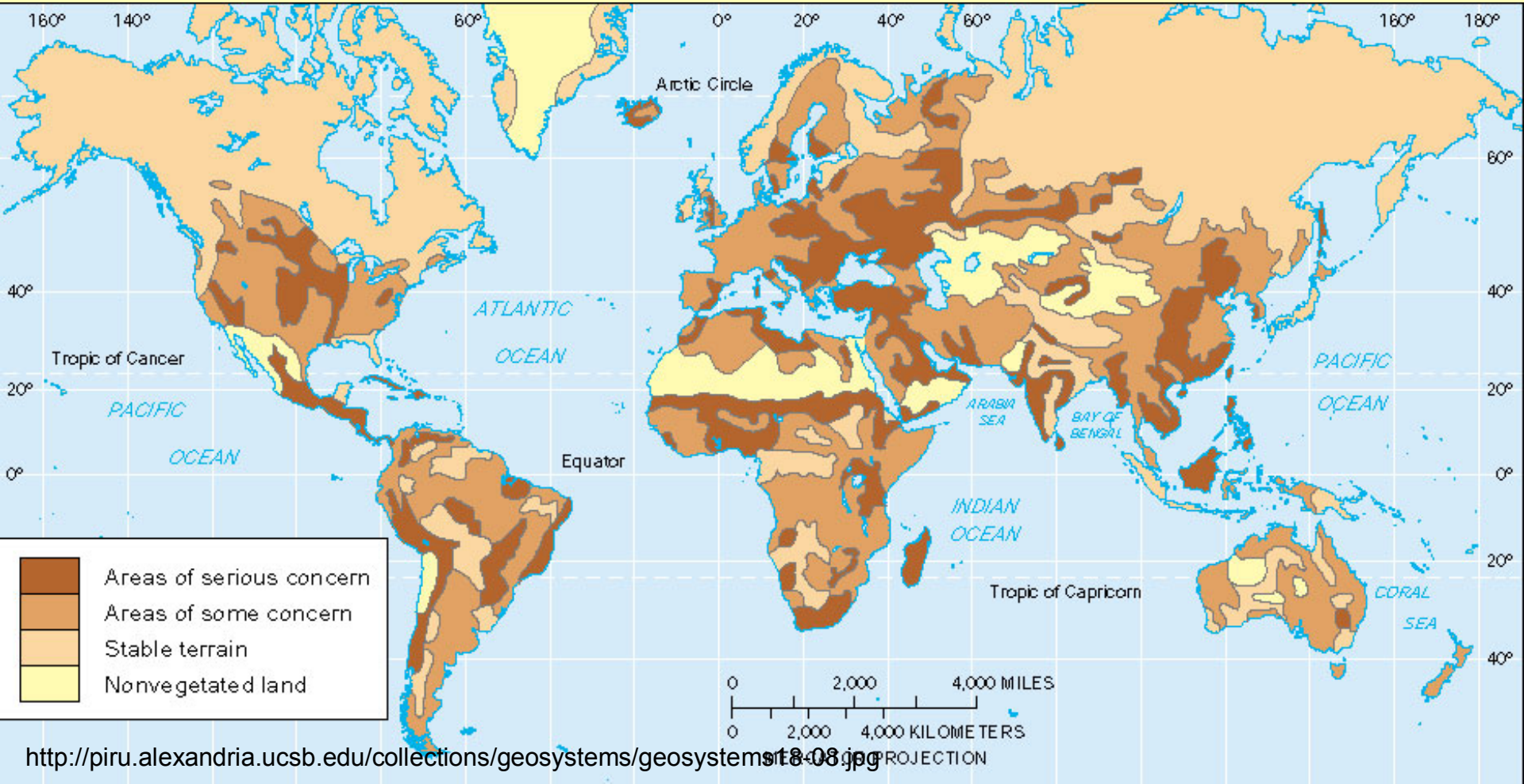
Water Erosion

pasture.ecn.purdue.edu/ ~abe325/present/sld024.htm

pasture.ecn.purdue.edu/ ~abe325/present/sld024.htm

Soil Erosion

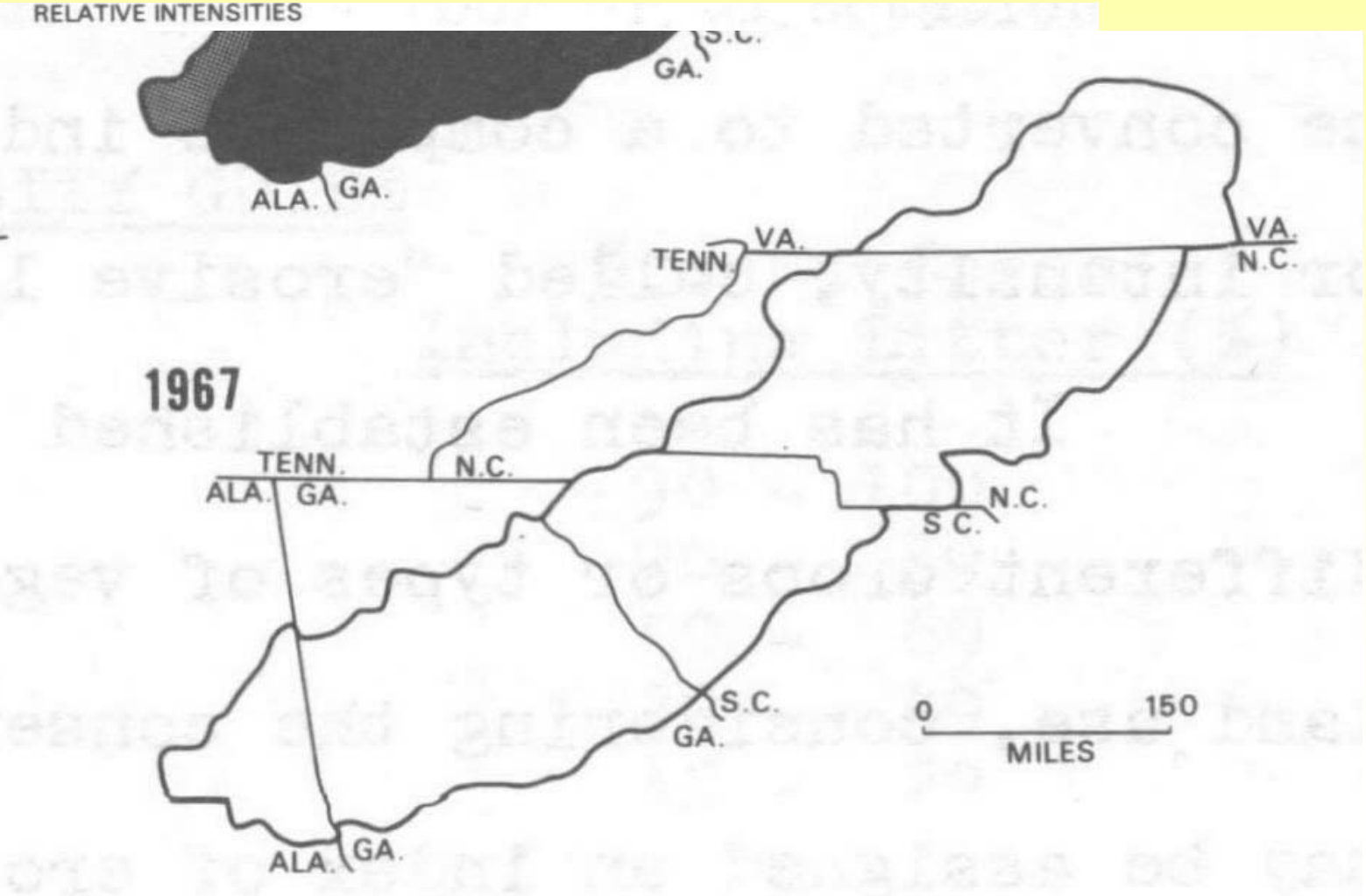
Where should we be concerned about it?



http://piru.alexandria.ucsb.edu/collections/geosystems/geosystems18-08.jpg

Soil Erosion

History in Georgia and surrounding area



Trimble (1974)

Soil Erosion

History in Georgia and surrounding area

www.cviog.uga.edu/.../ htmpages/providence1.htm

Controlling Soil Erosion

Terracing

darkwing.uoregon.edu/ ~mmorgan1/chinapics/

Controlling Soil Erosion

Contour strip cropping

http://www.wi.nrcs.usda.gov/programs/solutions/contourbuffer.html

pasture.ecn.purdue.edu/ ~abe325/present/sld024.htm

Controlling Soil Erosion

Grass waterways

http://www.wi.nrcs.usda.gov/programs/images/grasswaterway.jpg

Controlling Soil Erosion

Upland dams

http://www.wi.nrcs.usda.gov/programs/solutions/waterbasin.html

www.mapleviewfarm.com/ pages/farmopsnarative.html

Controlling Soil Erosion

Conservation tillage

http://www.weru.ksu.edu/new_weru/multimedia/control/big/008.jpg

Controlling Soil Erosion

Cover cropping

www.alaskaswcds.org/ Palmer/buftypes.html

www.agroecology.org/ cases/rbcovercrop.htm

Controlling Soil Erosion

Converting land to pasture

commodities.caes.uga.edu/. ../species/wheat.htm

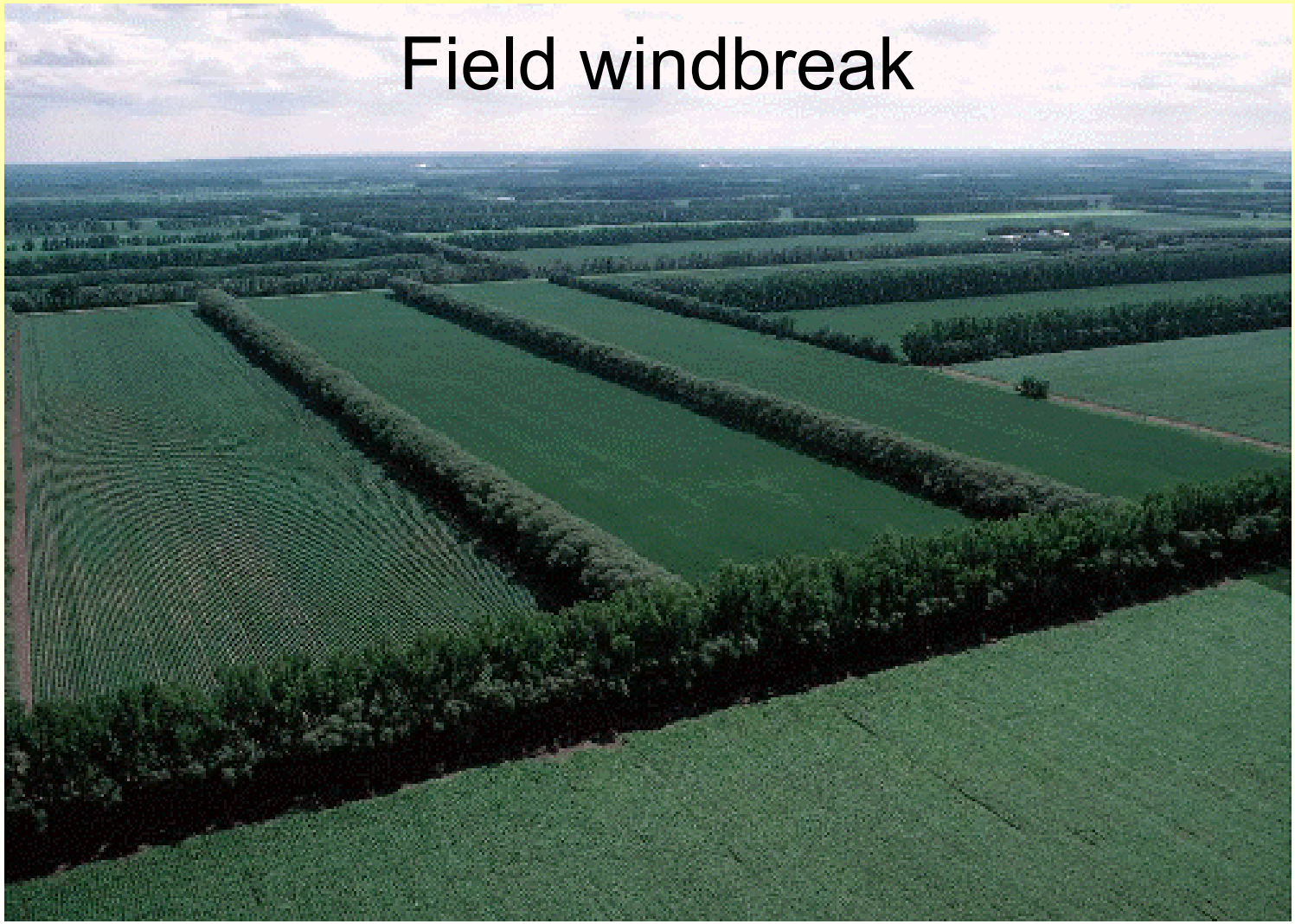
Controlling Soil Erosion

Planting trees

http://www.wi.nrcs.usda.gov/programs/solutions/treeplanting.html

sherpaguides.com/.../ natural_history/

Controlling Soil Erosion



www.alaskaswcds.org/ Palmer/buftypes.html

Soil Conservation

http://www.eecis.udel.edu/~davis/stamps/plateblocks/preview/by_name/soil_conservation59_prev.gif

International Union of Soil Sciences

www.iuss.org

United States Department of Agriculture
NRCS Natural Resources Conservation Service

SOIL AND WATER CONSERVATION SOCIETY

Soil Science Society of America

Soil Conservation Research in Watkinsville

Soil Conservation Research in Watkinsville

Soil Conservation Research in Watkinsville

Soil Conservation Research in Watkinsville